

What is claimed is:

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1. A washing machine, comprising:

a spin basket rotatably positioned in a tub;

a pulsator positioned in the spin basket to be in a relative rotary motion;

a driving motor installed at the lower portion of the tub;

a pulsator shaft directly connected from the driving motor to the pulsator,  
the pulsator shaft for transmitting rotary power;

a basket shaft connected from the outside of the pulsator shaft to the spin  
basket so as to form a dual shaft structure together with the pulsator shaft; and

a clutch means for transmitting power of the driving motor to the basket  
shaft or intercepting the power of the driving motor to the basket shaft

wherein the clutch means comprises:

a coupling member having a magnetic member at least in one part,  
combined around the basket shaft, and combined with a rotor of the driving motor  
in a state where the coupling member moves downward, the coupling member for  
transmitting the rotary power of the driving motor to the basket shaft; and

a solenoid actuator having a solenoid coil and fixed to the lower portion of  
the tub, the solenoid actuator for supplying electromagnetic repulsive force  
between the solenoid actuator and the coupling member so that the coupling  
member is separated from the rotor of the driving motor, to thus push the coupling  
member upward.

2. The washing machine of claim 1, wherein the coupling member is

combined with the basket shaft and the rotor of the driving motor in a serration

method, to thus be in an up and down motion.

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3. The washing machine of claim 1, wherein a bearing housing for supporting the basket shaft is fixed on the bottom of the tub and the solenoid  
5 actuator is supported to the bearing housing.

4. The washing machine of claim 3, wherein an elastic means for supplying elasticity so that the coupling member rapidly moves downward when electromagnetic repulsive force is cancelled is comprised between the coupling  
10 member and the bearing housing.

5. The washing machine of claim 1, wherein the coupling member comprises a cylindrical non-magnetic coupling combined with the basket shaft, the non-magnetic coupling combined with or separated from the rotor of the driving  
15 motor, while being in an up and down motion, a ring-shaped conductive coupling corresponding to the solenoid actuator in an up and down direction and fixed to the upper end of the non-magnetic coupling, a ring-shaped magnetic coupling formed of a magnetic member and fixed to the upper end of the non-magnetic coupling, which is the center of the conductive coupling.

6. The washing machine of claim 5, wherein the non-magnetic coupling is formed of synthetic resin.

7. The washing machine of claim 5, wherein a coupling tooth axially  
25 and longitudinally formed in the inner circumference of the non-magnetic coupling

so that the coupling tooth is combined with the basket shaft by a serration method.

8. The washing machine of claim 5, wherein the conductive coupling is formed of a metal having conductivity.

9. The washing machine of claim 5, wherein a uniform opening is formed between the conductive coupling and the magnetic coupling in a radius direction.

10. The washing machine of claim 9, wherein the lower end of an elastic means supported by the lower portion of the tub, the lower end of the elastic means for supplying elasticity to the coupling member is inserted into the opening between the conductive coupling and the magnetic coupling.

11. The washing machine of claim 1, wherein the solenoid actuator comprises a solenoid coil positioned around the coupling member and a solenoid case fixed to the lower portion of the tub, the solenoid case for supporting the solenoid coil.

12. The washing machine of claim 11, wherein a bearing housing for supporting the basket shaft is installed in the lower portion of the tub and the solenoid case is fixed to the bearing housing.

13. The washing machine of claim 11, wherein the solenoid case is formed of a magnetic member.

14. The washing machine of claim 11, wherein a plurality of axial slits are formed in the solenoid case.

5 15. The washing machine of claim 14, wherein the slits are uniformly formed in the solenoid case to be separated from each other by a predetermined distance in the direction of a circumference.

10 16. The washing machine of claim 11, wherein the solenoid case comprises a coil fixing portion having a cylindrical portion and a bottom portion and having the solenoid coil 53 inside and a flange portion extended from the upper end of the coil fixing portion in the direction of a radius and fixed to the lower portion of the tub.

15 17. The washing machine of claim 1, further comprising a transformation operating means for applying voltages of different levels to the solenoid coil according to the position of the coupling member.

20 18. The washing machine of claim 17, wherein the transformation operating means can supply the voltages of the different levels to the solenoid coil during an initial operation for generating electromagnetic force so as to move the coupling member 41 upward and during a maintaining operation for maintaining a state where the coupling member is completely moved upward.

25 19. The washing machine of claim 17, wherein the transformation

operating means comprises a position sensor for sensing the position of the coupling member, a trans installed on a line for supplying power to the solenoid coil, the trans for supplying the voltages of different levels, and a switch means installed on a line between the trans and the solenoid coil, the switch means for  
5 selecting one among the voltages of the different levels, which are provided by the trans, according to a signal of the position sensor.

20. The washing machine of claim 19, wherein the switch means is a relay switch operated according to a signal of a control unit receiving the signal of  
10 the position sensor.